DR-63. TUNING ELECTRICAL AND PHYSICAL PROPERTIES OF POLYMERS BY OZONE EXPOSURE

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The fabrication and performance improvement of organic solar cells (OSCs) and Organic Light-Emitting Diodes (OLEDs) are the two key issues in the scientific and industrial community of organic electronics. Vital scientific issues in such devices include choice of active layers or donor/acceptor materials, active layers, pattering methods for device electrodes as well as the interface property of the device layers and surface modification used in device fabrication. Surface modification based route has now become a material and process compatible approach for patterning electrodes of such emerging devices. Here, the use of surface modification in controlling wetting/dewetting is used as a novel method in patterning of polymers and device metal electrodes. On the other hand, the surface/interface modifications also controls energy level alignment at interfaces, and it is related to key issues like charge injection barrier, dipole barrier, contact resistance that are detrimental of the device efficiency. The method is based on the use of UV-Ozone exposure for use in tuning the work function a conductive polymer called PEDOT : PSS (poly-3,4-ethylenedioxythiophene), where it controls charge injection and extraction at active layer-electrode interface in OLEDs and OSCs, respectively. The devices physics, in both OLEDs and OSCs, in relation to tuning the work function of the polymer will be discussed in detail. Finally, the I–V, EQE characteristics and efficiency of the OLEDs and OSCs, fabricated by UV-Ozone based modification of PEDOT : PSS, will be correspondingly compared with an the devices fabricated without a modification of the conductive polymer.